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PETROGRAPY.[1]

The Ejected Blocks of Monte Somma.—Johnston Lavis[2] has begun a thorough study of the ejected blocks of Monte Somma, with especial reference to their petrography and the nature of the metamorphic changes that have been produced in them by the lavas by which they were enclosed. The druse minerals of the blocks have long been known, but their nature as rocks has been left uninvestigated. The author proposes to study in detail about 700 specimens of the blocks, including many varieties. He begins by describing some 30 that were originally stratified Cretaceous limestones containing carbonaceous material. The first stage in their alteration seems to be the conversion of bituminous substance into graphite, and the crystallization of the rock into marble. The crystallization has not destroyed the original bedding bands, nor the most delicate structures exhibited by them, hence it is assumed that fusion or softening of the rock did not accompany the crystallization processes. A few olivines were formed at this tisme, and these consequently are the first products of the metamorphosing agency. They appear principally as inclusions in the calcite. In the next stage of alteration the graphite disappears, and a saccharoidal marble results. This contains more or less colorless olivine, and passes rapidly into a mass of olivine, colorless pyroxene, wollastonite and biotite, where impurities were present in the original rock. In the earlier stages of metamorphism the calcite and the silicate minerals will exist in different bands, but in later stages silicates and calcite intermingle, and finally a purely silicate rock results. The order in which new minerals seem to develope is thought to be the following; olivine, periclase, humite, spinel, mica, fluorite, galena, pyrite, wollastonite, garnet, vesuvianite, nepheline, sodalite, feldspar, secondary calcite, tremolite, brucite. The article is illustrated by three lithographic plates. It will repay close study by students of contact action, as we have recorded in the blocks the effects of the action of a magma upon a limestone, in all its stages.

Phonolites from the Black Hills.—The sanidine-trachyte described by Caswell[3] from Bear Lodge in the Black Hills, has been reexamined by Pirsson,[4] who finds it to be a phonolite with phenocrysts of anorthoclase and pyroxene, in a groundmass of the usual components of phonolite. The anorthoclase has the composition:

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[1] Edited by Dr. W. S. Bayley, Colby University, Waterville, Me.

[2] Tarns. Edin. Geol. Soc., VI, 1893, p. 314.

[3] U. S. Geog. & Geol. Survey of Rocky Mts. 1880. Cap. VII, p. 471.

SiO_2	Al_2O_3	Fe_2O_3	CaO	Na_2O	K_2O	H_2O	Total	Sp. Gr.
66.44	19.12	.56	tr	7.91	5.10	.57	= 99.70	2.585

The nepheline is all in the groundmass where it appears as idiomorphic crystals. The density of the rock is 2.582 and its composition:

SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	MnO	CaO	BaO	MgO	Na_2O	K_2O	H_2O	Cl	SO_3	Total	Cl
61.08	.18	18.71	1.91	.63	tr	1.58	.05	.08	8.68	4.63	2.21	.12	tr	=99.86	—.03=99.83

A second occurrence of phonolite within the same region is in a dyke just south of Deadwood. It consists of phenocrysts of reddish feldspars and black hornblendes that approach barkevikite in properties. The rock from the Black Hills sold by the dealers as tinguaite is a dense aggregate of pyroxene phenocrysts in a matrix of feldspar and aegirine, with an occasional patch of nepheline.

The Origin of Norwegian Iron Ores.—The iron and other ores of many of the Norwegian localities are connected genetically with granites and gabbroitic eruptives. The iron ores in veins are supposed by Vogt[5] to be due to contact action between granite and the surrounding rocks. Those connected with the gabbros are basic accumulations, whose origin is ascribed to differentiation of the basic magma. In consequence of this differentiation, which is governed largely by Soret's principle and the differences in density of the various differentiated products, the gabbro splits into labrador-rock and various iron-olivine and iron-pyroxene compounds, and in these latter are accumulations of magnetite and ilmenite large enough to constitute ore bodies. Each of the iron-pyroxene rocks is described by the author and the iron ores associated with them are characterized. The titanium of the iron is thought to have originated mainly in the olivine and other basic components of the normal gabbro.

The Tonalites of the Rieseferner.—The tonalites of the Rieseferner in the Tyrol are again the subject of careful petrographical study.[6] The normal tonalite (hornblende–mica–quartz–diorite) which is a coarse granular rock, on its periphery often becomes finer grained and porphyritic. Large biotites and hornblendes are scattered through its groundmass, which remains fine grained, and the rock thus takes on a prophyritic habit. At other times the decrease in the size of its constituent grains is accompanied by a decrease in the proportion of plagioclase and quartz present in the rock and a large increase in the orthoclase present, while hornblende disappears completely. It is unnecessary to give the petrographical details of the author's paper. It should be mentioned, however, that the feldspars are very carefully studied by comparing the differences in their refracting indices, and many new points are brought out concerning their relations to each other. Some of the plagioclases were found to consist of nuclei of basic plagioclase, enclosing areas of a more acid feldspar identical with an acid peripheral zone. The phenomenon is thought to be due to corrosive influences. In addition to the various phases of the tonalite mentioned, the author makes a careful study of the veins cutting them, and of the slight alterations they have suffered and he refers to the existence of gneiss fragments occasionlly met with in their peripheral portions.

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[4] Amer. Jour. Sci., XLVII, 1894, p. 341.

[5] Geol. Fören Stock. Förh. 13 and 14.

[6] Becke: Min. u. Petrog. Mitth., XIII, p. 379.

Petrographical News.—McMahon[7] cites, as evidence in favor of the eruptive character of the Dartmoor granite, and in opposition to the view of Ussher that it resulted from the fusion by pressure of preexisting pre-Devonian sedimentaries, the following facts. Its apophyses cut the surrounding rocks. The metamorphic changes effected in the latter are the result of contact action. Finally the other rocks with which the granite is associated show no evidence of the great pressure, to which they must have been subjected if the granite were truly a fused sedimentary.

Associated with the argillites, graywackes and other sedimentary rocks of the Keewatin series near Kekaquabic Lake in Northeastern Minnesota, Grant[8] has discovered volcanic fragmentals and amphibole schists, the former of which are recognized as diabase tuffs and the latter as their recrystallized representatives.

A quartz bearing leukophyre variety of diabase porphyrite, forms intrusive layers in the Carboniferous schists at the Hernitz Mine near Saarbrücken in the Pfalz.[9] The rock was regarded by Weiss as a melaphyre.

[7] Quart. Journ. Geol. Soc., XLIX, p. 385.
Proc. Somerset Arch. & Nat. Hist. Soc., Vol. 28, p. 892.

[8] Science, XXIII, 1894, p. 17.

[9] Laspeyres: Corr. Blatt. Naturh. Ver. Bonn., 1893, p. 47.

The tuffs found with the nepheline leucite basalts of the Dauner region in the Eifel are made up of augite, mica, and olivine fragments, augite crystals, glass particles and lapilli cemented together by quartz and felspar which represent an original glassy cement.[10]

On the west coast of the Island of Celebes, Wichmann[11] finds boulders of an epidote glaucophane-mica schist, supposed to be associated somewhere in the interior of the island with mica quartzite.

[10] L. Schulte: Verh. d. Naturh. Ver. Bonn., 1893, p. 295.

[11] Neues Jahrb. f. Min. etc., 1893, II, p. 176.